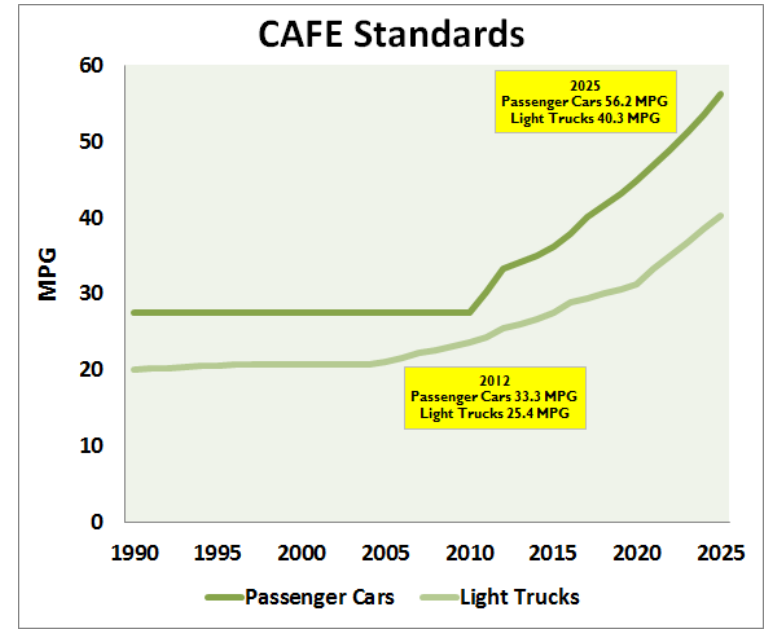
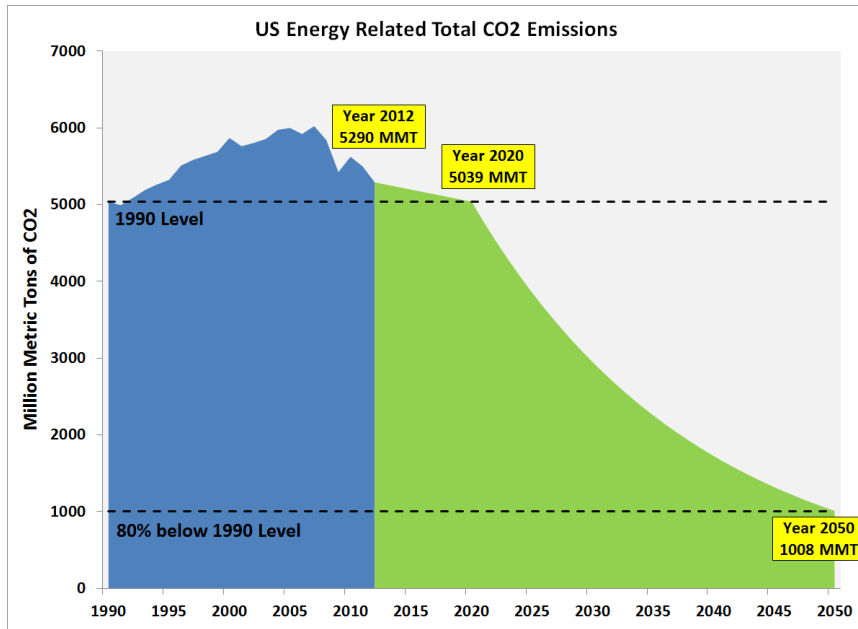
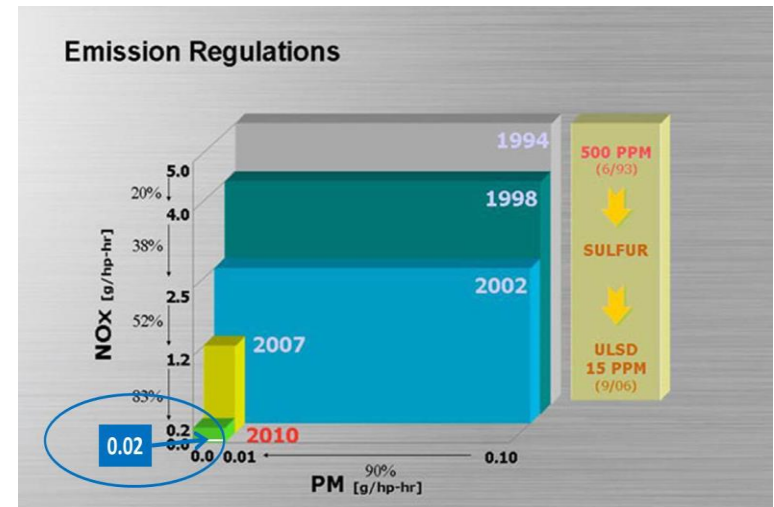


# Global, National Goals on Emissions



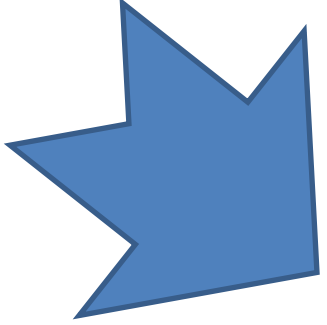
## EXAMPLES

- GHG avg reduction/year = - 4.2%
- NOx avg reduction/year = - 15.7%
- PM avg reduction/year = - 18.5%
- Fuel econ avg increase/year = + 4.9%



# Convergence of Enablers/Drivers

Increasing  
Efficiency

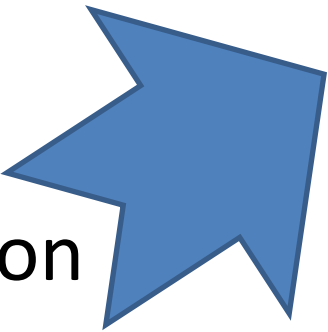


Emission  
Reductions  
climate and criteria

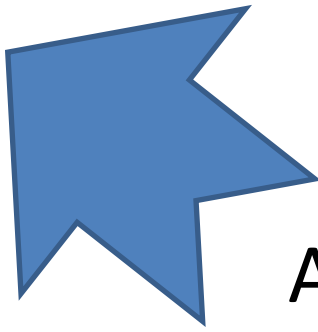


*High-  
efficiency,  
extremely low  
emission, low  
carbon  
solutions*

Electrification  
of Systems



Automation/  
Connected Tech



# Port of Long Beach, Middle Harbor



- Automated Electric AGVs

# Port of LA, TraPac Terminal



- Automated Electric Straddle Carriers



**Kenworth**  
NG-REEV



**BYD**  
BEV

43 Truck ZE Drayage Demo  
California ARB/Air Districts – 4 OEMs – 5 Ports



**Volvo**  
PHEV

**Peterbilt**  
BEV; NG-REEV



# Port of Savannah

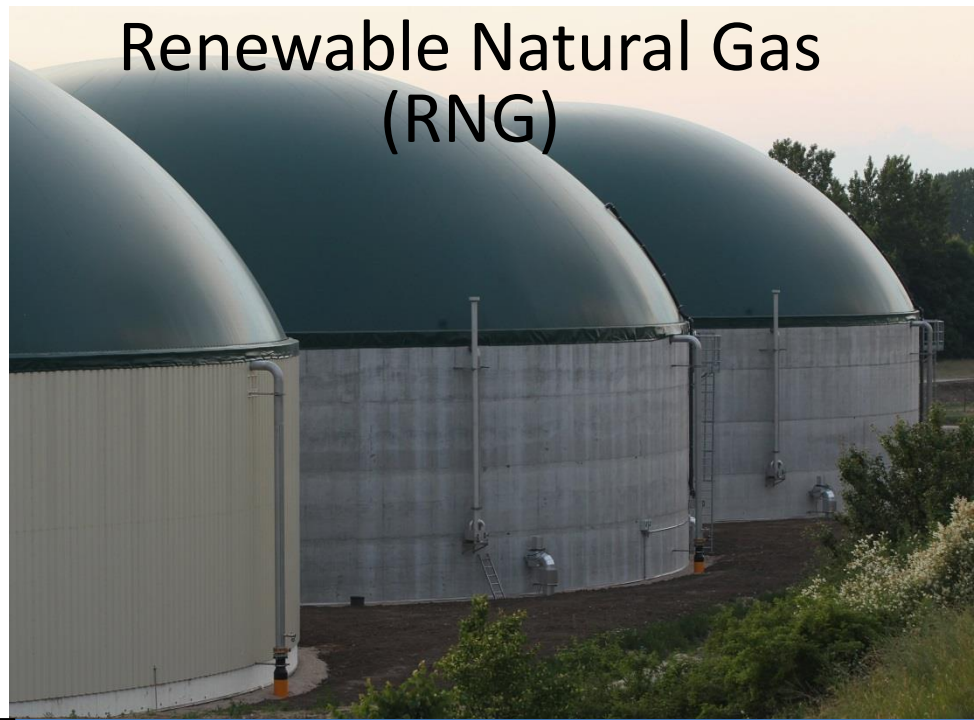


- Electric Gantries
- Rubber Tire Gantries (RTG)





# Renewable Natural Gas (RNG)



# Renewable Diesel – Important Pathway





# 43 Truck ZE Drayage Demo California – Ports – Air Districts - OEMs

- BYD, Kenworth, Peterbilt, Volvo
- Partners BAE, Transpower, most state air districts
- BEV, PHEV, NG-REEV technologies
- CALSTART helped recruit, design, organize program



# Conceptual: Corridor Transformation

